

'It would be interesting to know whether other snakes also produce sound and the circumstances under which they do so.'

Not far from Bombay on 9 January 1955 I saw a large Dhaman (*Ptyas mucosus*) which, when chased, went into a hole. We caught hold of its tail and after considerable effort, which included some rough handling, pulled it out and carried it to camp where Messrs Sálím Ali and B. Biswas of the Zoological Survey of India were also present. While being carried and for some considerable time afterwards, it uttered several kinds of noises which included a low whine and variations thereon.

Upon receipt of Dr. Behura's letter I wrote to Dr. W. C. Osman Hill, Prosector, Zoological Society of London, whose reply reads in part:

'Our experience here is that no snake produces any sound other than hissing, but the quality and tone of the hiss may be altered by the presence of pathological secretions within the respiratory passages. I think this may be the case with the Python mentioned, which agrees with a record we have for a Boa. But the case of the Dhaman appears unique as this was presumably a healthy animal.

'I am told that in some travel books cases have been cited of Anacondas snoring, but this has never been confirmed by scientists.'

BOMBAY NATURAL HISTORY SOCIETY,
91 WALKESHWAR ROAD, BOMBAY 6,
September 11, 1958.

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17. LARVAL WATER-MITES (HYDRACARINA) PARASITIC ON INSECTS, WITH NOTES ON THE DISPERSAL OF SMALL FRESHWATER INVERTEBRATES

This paper summarises the previous literature on larval water-mites parasitic on insects and gives records of my observations on this subject with a discussion of the life-history and the direct and indirect effects of the parasite on host insects. The general problem of the dispersal of small freshwater invertebrates by flying animals is reviewed.

There are many recorded instances of larval water-mites parasitising aquatic insects. The adult mites are free-living and carnivorous. They lay eggs on water plants and the six-legged larva which hatches out attaches itself to a variety of aquatic animals. Both vertebrates and invertebrates are hosts to these parasites. They have been reported on the Corixidae (water boatmen) by Soar (1901), Hungerford (1919), Pearse and Walton (1939), Griffith (1945), Lausbury (1955), and Leston (1955). I found them on the corixid species *Sigara lateralis* Leach,

S. dorsalis Leach, *S. distincta* (Fieb.), *S. fossarum* Leach, *S. nigro-lineata* Fieb., and *Hesperocorixa linnei* (Fieb.) [Fernando (1956), unpublished]. They have also been reported from the Notonectidae (backswimmers) by Soar (1901), from the Dytiscidae (diving beetles) by Soar and Williamson (1925), and from the hydrophilid beetle *Helophorus brevipalpis* Bedel by me [Fernando (1956) unpublished]. Carpenter (1928), Ward and Whipple (1945), and Mellanby (1953) refer in general to larval water-mites parasitic on insects.

In Ceylon I have found larval water-mites parasitising aquatic insects on a few occasions. They were found on the water scorpion *Ranatra elongata* Dohrn, taken from a drying up pond in Habarana. Five specimens of this water scorpion were captured and all of them were heavily infested, the mites being attached to the thorax, abdomen, and legs, very often on the soft parts between the chitinous plates of the body. The largest number of mites on a single individual was 16. The slowness of movement of these insects and the fact that the pond was drying up and crowded with insects accounts for the large number of mites. A single larval mite was found on the lower surface of the abdomen of the water strider *Hydrometra vittata* Stal, captured at Nugegoda. In the dytiscid beetle *Eretes sticticus* L., also taken at Habarana with the water scorpions, 5 specimens of a total catch of 16 were infested. Two or three mites were found on a single insect and they were attached to the dorsal surface of the elytra and the underside of the thorax and abdomen.

Larval water-mites are sometimes found on terrestrial insects with aquatic larva. Ward and Whipple refer to this phenomenon in general. Weerekoon (1956) found four larval mites attached to the abdomen of the chironomid fly *Chironomus (Chironomus) supplicans* (Meigen) taken in an emergence trap. I found a single larval water-mite on the underside of the thorax of the dragonfly *Diplocodes trivialis* Rambur, captured at Nugegoda. Weerekoon (personal communication) suggested that the larval mites probably attached themselves anew after the final moult of the insect larva. It seems more likely however that the shedding of the larval or pupal skin does not remove the larval mite.

The dispersal of freshwater invertebrates by larger animals is a very important phenomenon and results in the spread of the species into isolated bodies of water. I have found water-mites in isolated bodies of water. Boycott (1936) found small bivalves in isolated ponds and considers birds to be the chief agency in their dispersal. He suggested that aquatic insects may be effective over short distances. Charles Darwin in his famous book THE ORIGIN OF SPECIES was the

first to focus attention on the importance of larger animals in the dispersal of smaller forms. He believed this phenomenon to be widespread, and recorded two instances one of the freshwater mollusc *Ancylus* carried on the water beetle *Colymbetes*, and the other of a duck carrying freshwater shells on its feet. Kew (1895) published a book on the subject of the dispersal of shells in which he recorded instances of bivalves attached to aquatic insects. Carpenter (1928) discusses the role of insects in the dispersal of Mollusca and Arachnida and suggests that they play an important part in extending the range of species found in ponds and streams. Fernando (1954) recorded bivalves on Corixidae and has summarised the earlier literature on the subject of dispersal of Mollusca by aquatic insects. Weerekoon (1956) suggests that water-mites are dispersed from one body of freshwater to another by insects. Since water-mites are found commonly on aquatic insects which are known to fly from one body of freshwater to another [Fernando (1956) unpublished] these are an effective means of dispersal of the mites.

Leston (1955) records earlier deaths among mite-infested, overwintering Corixidae in spring. It is likely, however, that the weaker and therefore slower moving of insects are more easily infested in the first instance. The same author mentions that the formation of the dorsal air film in Corixidae is interfered with by the presence of the mites.

Further observation is likely to show that larval water-mites infesting insects is a widespread phenomenon. The larval mite obtains its nourishment from the insect and must therefore cause some harm to it. The extent of this harm is not known. There is no definite evidence that mite infestation increases the mortality of the insects directly. However, indirect effects by hindering the insect in its movement and generally weakening it are likely to result in increased mortality as a result of predation, as has been shown in the case of parasitised fish by Van Dobben (1952). An interesting feature in the life history of these mites is that moulting of the insect larva does not remove the larval mites. Insects play an important part in the dispersal of the mites from one body of freshwater to another as in the case of some other invertebrates.

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February 17, 1958.

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18. ADDITIONS TO THE CRAB FAUNA OF BOMBAY STATE

(With two plates)

An account of the Brachyuran fauna of the Bombay coast was given in the previous issues of this journal (Chhapgar, 1957, *JBNHS* 54: 399-439; 503-549). Collections of the crabs made subsequent to the publication of this report on 'The Marine Crabs (Decapoda: Brachyura) of Bombay State' revealed the occurrence of three new distributional records. A systematic description of these three forms is given below.

Tribe BRACHYGNATHA

Subtribe OXYRHYNCHA

Family HYMENOSOMIDAE

Genus *Elamena* Milne-Edwards

Elamena sindensis Alcock

Elamena sindensis, Alcock, *Journ. As. Soc. Bengal* 69, p. 386 (1900).

Kemp, *Rec. Ind. Mus.* 13, p. 274 (1917).

Tesch, *Siboga Exped. Rep.* 39 c, p. 24 (1918).

Chopra and Das, *Rec. Ind. Mus.* 32, pp. 424, 425 (1930).